

TAXONOMIC POSITION OF
LIPPISTES PEHUENSIS MARWICK, WITH A
REVIEW OF THE SPECIES OF *CONCHOLEPAS*
(GASTROPODA, MURICIDAE)

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Plate 4

SUMMARY

Lippistes pehuensis Marwick, 1926, placed in *Hartungia* Bronn (Janthinidae) by recent workers, is transferred to *Concholepas* Lamarck (Muricidae) on the basis of its resemblance to the Australian Miocene *C. antiquata* Tate, 1894. *C. antiquata* Tate is redescribed, and other species of *Concholepas* are briefly reviewed.

INTRODUCTION

The gastropod species described as *Lippistes pehuensis* by Marwick (1926: 319, pl. 73, figs. 6, 8) has had a chequered nomenclatural history since its erection. Finlay (1927: 396) placed it in his new genus *Zelippistes*, but the lack of relationship to *Zelippistes benhami* (Suter) (see Dell and Ponder, 1964) is obvious. Later Finlay placed the species in *Heligmope* Tate, considered by Tate to be a naticid but by Finlay to be a janthinid. Finlay had placed *Turbo postulatus* Bartrum in *Heligmope* earlier in the same paper, and noted its close resemblance to the Australian Pliocene *Heligmope dennanti* Tate. Late in the paper he commented: "... *Heligmope postulatus* (Bartrum) seems to have an ancestor in New Zealand in *Lippistes pehuensis* Marwick This has the same sculpture and basal sinus, but the spire is so much lower as to be sunk below the body whorl, so that the shape of *Lippistes* is simulated" (Finlay, 1931: 5). Later Fleming (1953: 135) synonymised *Heligmope* with *Hartungia* Bronn [1861], based on a species from the Azores, retaining *pehuensis* in *Hartungia* and *Hartungia* in the Janthinidae. Thus in the current list of New Zealand Cenozoic Mollusca (Fleming, 1966: 49) *pehuensis* is maintained as a species of *Hartungia*, in the Janthinidae.

Chance examination of a specimen of *Concholepas antiquata* Tate in the Dennant Collection, National Museum of Victoria, with Mr. T. A. Darragh, during September 1969, immediately suggested a much closer relationship between *Lippistes pehuensis* Marwick and *Concholepas antiquata* than between *Lippistes pehuensis* and *Hartungia*. This led to more detailed comparison of specimens, confirming the relationship with *Concholepas* to my satisfaction. This note formally transfers *Lippistes pehuensis* Marwick to *Concholepas* Lamarck (Muricidae, Suborder Neogastropoda) and removes it from *Hartungia* Bronn (Janthinidae, Suborder Heterogastropoda), and lists the species of *Concholepas* of the world that I have been able to trace.

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TAXONOMY

Family Muricidæ

Subfamily Thaidinæ

Genus *Concholepas* Lamarck, 1801

1801. *Concholepas* Lamarck, *Système des Animaux sans Vertèbres*: 69. Type species (by monotypy): *Concholepas peruviana* Lamarck, 1801 (= *Buccinum concholepas* Bruguière, 1789), Recent, western South America.
1847. *Conchopatella* "Chemnitz" Herrmannsen, *Indicis Generum Malacozoorum primordia* 1: 291 (*genus caelebs*, stated to be a synonym of *Concholepas* Lamarck; type species, here designated and here placed in the genus, *Conchopatella concholepas* = *Buccinum concholepas* Bruguière, 1789).

Concholepas pehuensis (Marwick, 1926)

Pl. 4, fig. 1-3

1926 *Lippistes pehuensis* Marwick, *Trans. N.Z. Inst.*, 56: 319, pl. 73, fig. 6, 8.1927 *Zelippistes pehuensis*. Finlay, *Trans. N.Z. Inst.*, 57: 396.1931 *Heligmope pehuensis*. Finlay, *Trans. N.Z. Inst.*, 62: 5.1953 *Hartungia pehuensis*. Fleming, *Aust. JI Sci.*, 15: 135.1966 *Hartungia pehuensis*. Fleming, *Bull. N.Z. Dept. Scient. Ind. Res.*, 173: 49, pl. 80, fig. 948, 950.

"Shell large, subdiscoidal, inflated, test thin. Spire scarcely projecting, surpassed but not involved by body. Whorls convex; body-whorl increasing rapidly in size, with narrow umbilicus. Suture impressed. Sculpture of about 13 broad very low spirals, absent on umbilical area, and becoming obsolete round aperture, crossed by numerous waved fairly strong growth-ridges. Aperture subcircular, dilated, adhering to parietal wall, with a well-marked sinus well out on lower margin; on early part of body this sinus forms low ridge bounding umbilicus" (Marwick). Apart from the sculptural details, Marwick's description would apply almost equally well to any of the fossil species of *Concholepas*.

Concholepas pehuensis is known only by the holotype, a slightly incomplete shell from GS1144, 60 chains west of Pehu Trig. Station, Okoko Road, Upper Waitara Survey District, North Taranaki (Tongaporutuan, Upper Miocene), lodged in the New Zealand Geological Survey (TM4494).

The upper part of the aperture of the holotype is partly broken away; the remaining posterior part of the last whorl bears a low, indistinct ridge, stronger than that in *C. concholepas* (Bruguière) but considerably weaker than that in *C. antiquata* Tate. The sinus ridge described by Marwick is in fact a fasciolar ridge, formed by the normal neogastropod siphonal notch in the anterior edge of the aperture; it is present in all species of *Concholepas*, but considerably more weakly developed in *C. pehuensis* than in the other species. The large, flaring aperture, the small spire, the narrow umbilicus (absent in *Hartungia*), the presence of a fasciolar ridge and smooth fasciolar-umbilical area, and the presence of a low posterior ridge clearly show that *pehuensis* belongs in *Concholepas*. The position of the spire about a third of the way down the inner lip and the very broadly flaring aperture cause a greater resemblance to *C. deshayesi* Rambur, from the Miocene of France, than to *C. antiquata*; the spire is close to the top of the aperture in *C. antiquata* and all other

Review of *Concholepas*

species. The sculpture of low, broad, indistinct, slightly rounded spiral ribs with linear interstices and no interstitial threads is highly distinctive. *Concholepas antiquata* and *C. deshayesi* have almost identical, relatively narrow, low, spiral cords with one to three low, broad threads filling each interspace, whereas the South American fossil and living species have relatively narrow, well-raised, widely spaced, nodulose spiral cords.

It is interesting to note that Marwick himself first suggested the relationship of *Lippistes pehuensis* to *Heligmope postulatus* (Finlay, 1931: 5). Dr. Marwick has informed me (pers. comm.) that the holotype of *Concholepas pehuensis* was the basis of his record (Marwick, 1931: 40) of "*Turbo*" *postulatus* from "the Taranakian beds of North Taranaki". Both Marwick and Finlay were influenced in this opinion by the close resemblance of the sculpture of *C. pehuensis* to that of species of *Hartungia*.

Concholepas antiquata Tate, 1894

Pl. 4, fig. 4-9

1894 *Concholepas antiquata* Tate, Proc. R. Soc. N.S.W., 27: pl. 20, fig 2.

The species has not been fully described previously. The shell is of small to medium size and very thin compared to that of *C. concholepas*, with a low spire reaching the same level as the top of the aperture or sunken slightly below it, so that it is very small in proportion to the last whorl. The last whorl is moderately to very greatly expanded, particularly over the last half-whorl, so that the aperture is very large, occupying almost the whole ventral surface of the shell. The sutures of the spire are deeply incised. The inner lip is smooth and thin, and reflected slightly over the parietal region and spire. The interior of the outer lip of some specimens bears low spiral ridges and grooves, corresponding respectively to the grooves and ridges of the external sculpture. A weak posterior sinus in the top of the aperture forms a relatively very prominent rib around a slight shoulder near the spire, and the only sculpture between the rib and the upper suture consists of low, irregular growth folds crossed by fine, ill-defined spiral threads. A well-marked anterior siphonal notch at the base of the aperture forms a very prominent fasciolar rib curving regularly from the base of the spire to the basal tip of the shell, marking off a narrow, deep umbilical chink beneath the spire and an unsculptured area between the fasciole and the inner lip. Between the posterior and anterior ridges the sculpture consists of low, irregular growth folds crossed by 12 to 24 low, broad, slightly round-topped spiral cords. Usually there is one broad, flat-topped thread filling each spiral interspace, but in some interspaces there are no threads (so that the primary cords are separated by a linear groove) and in others there may be up to three. The proportion of width to height varies greatly, so that in some specimens (in apertural view) the spire protrudes well to the left, the fasciolar rib and umbilicus are prominent, and the aperture is greatly expanded to the right (as in the specimen figured in Pl. 4, fig. 4-6). At the opposite extreme the spire, fasciole and umbilicus are scarcely visible in apertural view and the outer lip is relatively very little expanded (as in the specimen figured in Pl. 4, fig. 7-9).

Tate (1894: 171) compared the species with *C. concholepas* only, being unfamiliar with *C. deshayesi* Rambur (although he knew of the species name). However, *C. antiquata* is much more similar to *C. deshayesi* than to *C. concholepas*. To judge from the available figures of the French

species, the only significant difference between *C. antiquata* and *C. deshayesi* is that the spire is situated markedly lower down the inner lip in *C. deshayesi* than it is in *C. antiquata* and resembles that of *C. pehuensis*.

Tate recorded his two specimens of *C. antiquata* from G. B. Pritchard's collection, from "the clays at Mornington, Port Phillip Bay, and in the calcareous sands at Muddy Creek, Hamilton", and noted that they extended the range of the genus to the Eocene. The rocks at both localities mentioned by Tate are now known to be of Balcombian age. The Balcombian is correlated with the Helvetian (Middle Miocene) of Europe (Ludbrook, 1967: fig. 2), and *Concholepas* is not known before the Middle Miocene.

Dr. Mary Wade, Department of Geology and Mineralogy, University of Adelaide, has informed me (*in litt.*, 30.9.1969) that both the paratype from Muddy Creek, and the holotype (i.e. figured syntype), labelled "Schnapper Point" in Tate's hand-writing, are present in the Tate collection, lodged in the University of Adelaide. Mr. T. A. Darragh has informed me (*in litt.*, 9.10.1969) that Tate's usage of the term "Schnapper Point" is almost always synonymous with the locality now known as Fossil Beach, Balcombe Bay, Mornington, to judge from material in recent collections; in a few cases specimens labelled "Schnapper Point" came from Grice's Creek. As Tate (1894: 171) published the locality as Mornington, and as *Concholepas antiquata* has been recollected several times at Fossil Beach but never at Grice's Creek (see localities below), there can be little doubt that the holotype came from Fossil Beach, Mornington, and not from Grice's Creek.

In J. Dennant's personal copy of Tate's paper, held at the National Museum of Victoria, a note in the margin states that the specimen from Muddy Creek was collected by Dennant, and not by G. B. Pritchard. Thus either the "paratype" in the University of Adelaide could have been collected by Dennant rather than by Pritchard, or the National Museum of Victoria specimen in Dennant's collection could be Tate's paratype, and the Adelaide University specimen from Muddy Creek added after 1894. Apparently Tate frequently added material to his tablets (T. A. Darragh, pers. comm.); and the two Adelaide specimens, while both labelled in Tate's handwriting, were probably labelled at different times as their labels are in different inks (Dr. Mary Wade, pers. comm.). It is unlikely that this minor point will ever be resolved.

Nine specimens of *Concholepas antiquata* are held in the National Museum of Victoria: one in the Dennant Collection from Muddy Creek, Hamilton, Victoria (Balcombian; P26911); one in the F. S. Colliver Colln., from Mornington, Balcombe Bay, Port Phillip (Balcombian); three incom-

PLATE 4.

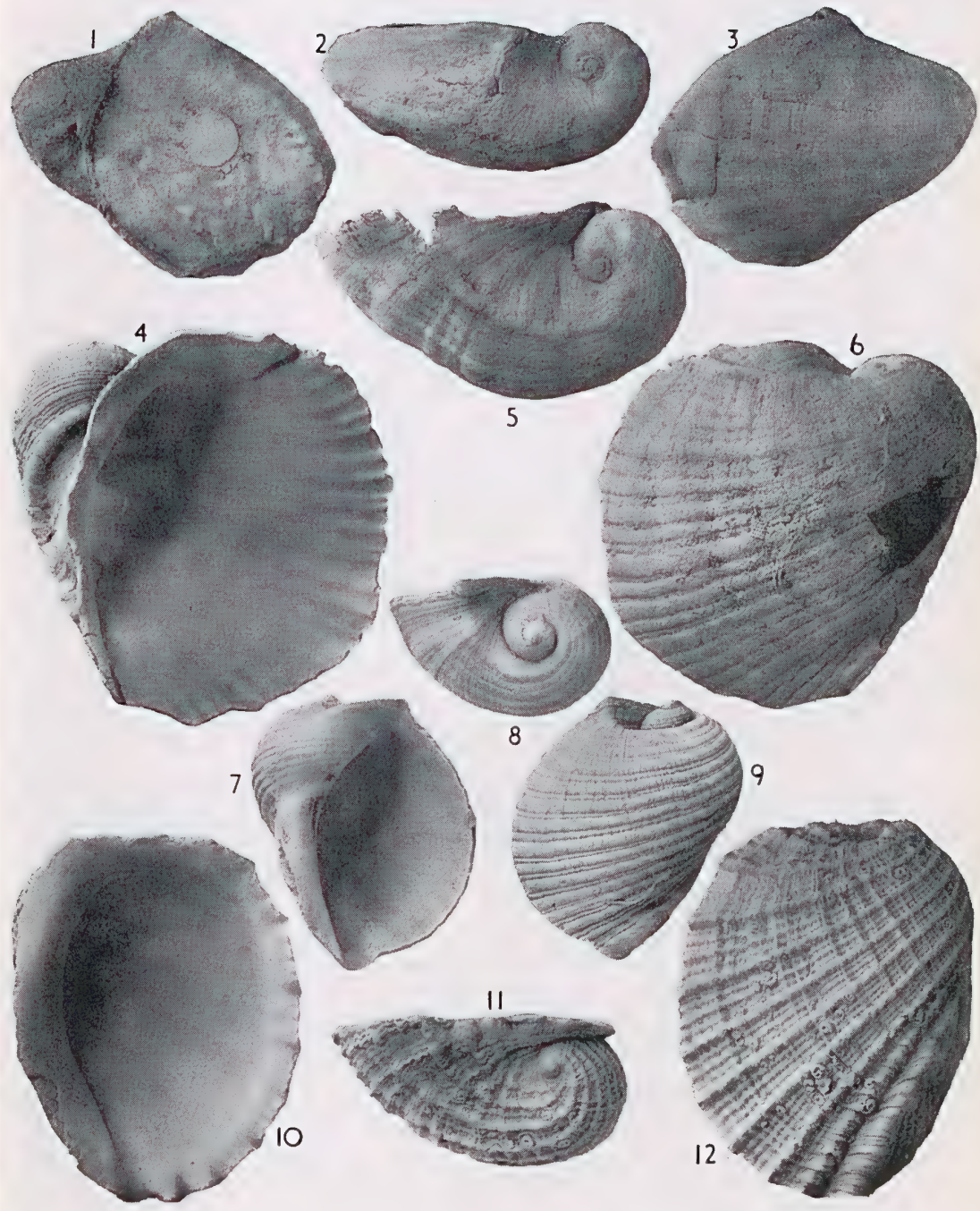
Fig. 1-3. *Concholepas pehuensis* (Marwick), holotype, ventral, apical and dorsal views. GS1144, Okoko Road, North Taranaki, New Zealand, Tongaporutuan (Upper Miocene); N.Z. Geological Survey, TM4494; 35.0 X 28.0 mm.

Fig. 4-6. *Concholepas antiquata* Tate, ventral, apical and dorsal views. Clifton Bank, Muddy Creek, Hamilton, Victoria, Balcombian (Middle Miocene); Dennant Colln., National Museum of Victoria, P26911; 39.6 X 39.4 mm.

Fig. 7-9. *Concholepas antiquata* Tate, ventral, apical and dorsal views. Fossil Beach, Mornington, Victoria, Balcombian (Middle Miocene); National Museum of Victoria, P5298; 28.6 X 23.6 mm.

Fig. 10-12. *Concholepas concholepas* (Brugulere), young specimen; ventral, apical and dorsal views; beach shell, Chepu, west coast of Chiloe Island, Chile; N.Z. Geological Survey, WM7702; 38.9 X 30.4 mm.

(All figures approx. X 1.5).



plete in the G. B. Pritchard Colln., from Muddy Creek; one in the W. Kershaw Colln., from Balcombe Bay (P4983); one with no data other than "Balcombe Bay" in F. Chapman's collection of comparative material (P5298); one excellent specimen from Balcombe Bay presented by Mr. R. Ferguson, 22.10.1969 (P26907); and one in the F. A. Cudmore Colln., from Balcombe Bay (P24868). The specimen in J. Dennant's collection from Muddy Creek is the most broadly expanded, and is figured here because it most closely resembles the holotype of *C. pehuensis*; the other figured specimen (P5298) was the most complete one at 5.9.1969, and resembles Tate's figure of the holotype.

Concholepas deshayesi Rambur, 1862

- 1862 *Concholepas deshayesi* Rambur, *J. Conch.*, Paris, 10: 86.
 1862 *Concholepas deshayesi* Rambur, *J. Conch.*, Paris, 10: 180, pl. 8, fig. 1, 2.
 1903 *Concholepas deshayesi*. Cossman, *Essais de Paléoconchologie Comparée*, 5: 81, pl. 2, fig. 28.
 1952 *Concholepas deshayesi*. Glibert, *Mem. Inst. R. Sci. nat. Beligiques*, (2), 46: 300, pl. 6, fig. 3.
 1963 *Concholepas deshayesi*. Glibert, *Mem. Inst. R. Sci. nat. Beligiques*, (2), 74: 26.

No attempt has been made to compile a complete synonymy. Rambur (1862a) originally described the species in a few lines of Latin, with few data other than dimensions, and the locality in the title of the paper, ".... des Faluns de Touraine". Later (Rambur, 1862b) he gave a much fuller description in French, compared the species with *C. concholepas* (Bruguère), and gave two excellent figures (pl. 18, fig. 1, 2). More recently the species has been figured clearly by Cossman (1903: pl. 2, fig. 28) and by Glibert (1952: pl. 6, fig. 3). The species is known only from the "Faluns de Touraine" and adjacent formations (Helvetian, Middle Miocene; Denizot, 1957: 195) of the Loire Basin, and is apparently rare.

Concholepas concholepas (Bruguère, 1789)

Pl. 4, fig. 10-12

- 1789 *Buccinum concholepas* Bruguiere, *Encyclopédie, Méthodique, Vers*, 1 (1): 252.
 1801 *Concholepas peruviana* Lamarck, *Système des Animaux sans Vertèbres*: 69.

No attempt has been made to compile a synonymy. Several other names have been given to South American Recent specimens of *Concholepas concholepas*, such as *C. patagonicus* Rochebrune and Mabilie (1891: H63, Pl. Moll. 2, fig. 6, 6) based on specimens from Cape Horn, and *C. oblongus* Reeve (1863: Pl. 2, fig. 2 a-c) based on specimens from "Cape Horn and the East side of Tierra del Fuego", but my knowledge of these is incomplete.

The species is common today on intertidal rocks in Chile, and has a latitudinal range from at least as far north as 17°S, and possibly as far as Mexico, to Cape Horn (Dr. R. K. Dell, pers. comm.). It has a relatively larger aperture and smaller spire than have the Miocene species discussed above, and has much coarser, nodulose sculpture. A specimen that probably belongs in this species was recorded from the Quaternary of Chile by Philippi (1887: 59, p. 58, fig. 12).

Concholepas kieneri Hupé, 1854

- 1854 *Concholepas kieneri* Hupé, *Hist. fis. pol. Chile, Zoologia*, 8: 203, pl. 3, fig. 4 (not seen).
 1887 *Concholepas kieneri*. Philippi, *Tert. Quart. Verstein. Chiles*: 59: pl. 6, fig. 1.
 1896 *Concholepas kieneri*. Möricke, *N. Jahrb. f. Min. Geol. Pal.*, 10: 567.

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The original work by Hupé (1854) is not available to me, but Philippi (1887: 59) stated that his figures were copies from those of Hupé. They show a small shell of similar form to *C. concholepas*, but with narrower, more widely spaced, and smoother spiral cords than in that species. The type locality is Coquimbo, Chile; the species was known to Möricke (1896: 567) from Coquimbo and Caldera, in the Coquimbo Formation (upper Pliocene) of Chile.

Concholepas nodosa Möricke, 1896

1896 *Concholepas nodosa* Möricke, *N. Jahrb. f. Min. Geol. Pal.*, 10: 567, pl. 11, fig. 14, 15.

Möricke figured a shell of similar form to narrow specimens of *C. concholepas*, sculptured as in *C. kieneri* Hupé but with very large, widely spaced nodules on the spiral cords. The "species" is possibly part of the variation of *C. kieneri*. It was known to Möricke only from Coquimbo, type locality of the Coquimbo Formation (upper Pliocene) of Chile.

Two further species have been referred to *Concholepas*: *Concholepas imbricata* "A. Valenciennes in Humboldt, *Voy. Intér. Amér. (Obs. Zool. II, 1832)*, 322" (Sherborn, 1927a: 3122); and *Concholepas laevigata* "A. Valenciennes in Humboldt, *Voy. Intér. Amér. (Obs. Zool. II, 1832)*, 323" (Sherborn, 1927b: 3360). Neither Humboldt's work nor Valenciennes' section of it is available in Australia or New Zealand, so that I have no knowledge of the status of the named forms. They are presumably South American fossils.

DISCUSSION

As far as I am aware the genus *Concholepas* is known fossil in the Middle Miocene of France and Australia and the Upper Miocene of New Zealand, and also occurs in the Pliocene to Recent of eastern South America. Many Thaidinæ have wide distributions and, apparently, long-lived planktotrophic veligers; that of Miocene *Concholepas* must have been longer-lived than most, allowing a rapid and wide dispersal of very similar forms. The French species and *C. antiquata* are both Helvetian (Middle Miocene) in age, so that correlation by means of species of *Concholepas* may eventually be possible.

In view of the wide distribution of *Concholepas* during Miocene times it is difficult to understand why it should now be restricted to the western coast of South America. A possible explanation is that the relatively narrow-shelled, coarsely sculptured *Concholepas concholepas* (and its relatives in the Pliocene) has a very much shorter larval life than Miocene species did. The finely sculptured, broadly-flaring, relatively very thin-shelled Miocene species may deserve separation in a new subgenus of *Concholepas*.

To judge from the present distribution of Mollusca, the Balcombe Clay at Fossil Beach, Balcombe Bay, was deposited in a depth of the order of 50 fms. (T. A. Darragh, pers. comm.), and a depth of at least this order is suggested by the fine siltstone matrix filling the aperture of the holotype of *Concholepas pehuensis*. The soft shelly sands making up the "Faluns de Touraine" (Gignoux, 1960, p. 624) were probably deposited in shallower water than the formations containing the Australasian *Concholepas*, but there seems little doubt that the Miocene species of *Concholepas* lived in considerably deeper water than the Recent rugged-

shelled *C. concholepas*, which has not been reported from below the littoral zone (Dr. R. K. Dell, pers. comm.). Thus the thin shells and fine sculpture of the Miocene species may be merely ecophenotypic characters.

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